

What is claimed is:

- 1    1.    An apparatus, comprising  
2            a catheter having a lumen;  
3            a conductive element disposed along the catheter; and  
4            a balloon having an interior in fluid communication with the lumen of the  
5 catheter, the balloon being formed of a conductive material conductively coupled to the  
6 conductive element, the balloon having a collapsed configuration and an expanded  
7 configuration.
- 1    2.    The apparatus of claim 1, wherein:  
2            the balloon in the expanded configuration having a size associated with a  
3 previously-formed tissue cavity.
- 1    3.    The apparatus of claim 1, wherein:  
2            the conductive material of the balloon includes a plurality of conductive  
3 portions, two adjacent conductive portions from the plurality of conductive portions  
4 being separated by an insulation portion from a plurality of insulation portions.
- 1    4.    The apparatus of claim 1, wherein:  
2            the conductive material is a first layer of balloon, the balloon further including a  
3 second layer and a third layer, the second layer of the balloon being formed of an  
4 insulation material, the third layer of the balloon being formed of a second conductive  
5 material.
- 1    5.    The apparatus of claim 1, wherein:  
2            the conductive material is a first layer of balloon, the balloon further including a  
3 second layer and a third layer, the second layer of the balloon being formed of an  
4 insulation material, the third layer of the balloon being formed of a second conductive  
5 material,  
6            the first layer of the balloon includes a plurality of conductive portions, two  
7 adjacent conductive portions from the plurality of conductive portions of the first layer  
8 of the balloon being separated by an insulation portion from a plurality of insulation  
9 portions,  
10          the third layer of the balloon includes a plurality of conductive portions, two  
11 adjacent conductive portions from the plurality of conductive portions of the third layer

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12 of the balloon being separated by an insulation portion from a plurality of insulation  
13 portions,

14 each conductive portion from the plurality of conductive portions of the first  
15 layer of the balloon being offset from a corresponding conductive portion from the  
16 plurality of conductive portions of the third layer of the balloon.

1 6. The apparatus of claim 1, further comprising:

2 the conductive material being a first layer of balloon, the balloon further  
3 including a second layer and a third layer, the second layer of the balloon being formed  
4 of an insulation material, the third layer of the balloon being formed of a second  
5 conductive material,

6 the first layer and the third layer of the balloon each being a bipolar electrode.

1 7. The apparatus of claim 1, the lumen of the catheter being a first lumen, wherein:

2 the catheter has a first end portion, a second end portion and a second lumen, the  
3 first end portion of the catheter being disposed within the balloon, the first end portion  
4 of the catheter having an inlet associated with the first lumen and an outlet associated  
5 with the second lumen,

6 a fluid regulator coupled to the second end portion of the catheter, the fluid  
7 regulator configured to circulate a fluid at a temperature within the balloon less than a  
8 temperature of the conductive material of the balloon.

1 8. The apparatus of claim 1, the balloon is a first balloon, the lumen of the catheter  
2 being a first lumen, further comprising:

3 a second balloon disposed outside of the first balloon, the second balloon being  
4 fluid permeable, the catheter including a second lumen in fluid communication with the  
5 second balloon.

1 9. The apparatus of claim 1, the balloon is a first balloon, the lumen of the catheter  
2 being a first lumen, further comprising:

3 a second balloon disposed outside of the first balloon, the second balloon being  
4 fluid permeable, the catheter including a second lumen in fluid communication with the  
5 second balloon; and

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6 a fluid regulator coupled to the second lumen of the catheter, the fluid regulator  
7 configured to control a rate of fluid per fusing from the second balloon based on an  
8 impedance associated with the second balloon.

1 10. The apparatus of claim 1, further comprising:  
2 an atraumatic tip disposed at a distal end of the balloon.

1 11. The apparatus of claim 1, further comprising:  
2 a guide wire disposed within the lumen of the catheter and an interior of the  
3 balloon.

1 12. The apparatus of claim 1, further comprising:  
2 the catheter has a first non-conductive layer, a second non-conductive layer and  
3 a conductive layer, the conductive layer being disposed between the first non-  
4 conductive layer and the second non-conductive layer, the conductive layer being  
5 electrically coupled to the conductive material of the balloon.

1 13. A method for operating a catheter having a balloon in communication with the  
2 catheter, comprising:  
3 percutaneously disposing the balloon into a previously-formed tissue cavity  
4 while the balloon is in a collapsed configuration, the balloon being formed of a  
5 conductive material;  
6 expanding the balloon into an expanded configuration, the balloon in the  
7 expanded configuration having a shape associated with a shape of the previously-  
8 formed tissue cavity; and  
9 applying a radio-frequency signal to the conductive portion of the balloon.

1 14. The method of claim 13, further comprising:  
2 circulating a fluid within the balloon, the fluid within the balloon having a  
3 temperature less than a temperature of the conductive material of the balloon.

1 15. The method of claim 13, the balloon being a first balloon, the catheter including  
2 a second balloon disposed outside the first balloon and being fluid permeable, further  
3 comprising:  
4 providing a fluid within a second balloon.

1 16. The method of claim 13, the balloon being a first balloon, the catheter including  
2 a second balloon disposed outside the first balloon and being fluid permeable, further  
3 comprising:

4 providing a fluid within a second balloon based on an impedance associated  
5 with the tissue cavity.

1 17. The method of claim 13, the applying including modifying the shape of the  
2 previously-formed tissue cavity into a substantially spherical shape, the method further  
3 comprising:

4 removing the balloon from the modified tissue cavity;  
5 inserting a radiation therapy device into the modified tissue cavity; and  
6 performing radiation therapy based on the radiation therapy device.

1 18. A apparatus for treating a margin tissue associated with a tissue cavity after  
2 removal of a tissue mass, comprising:

3 a tubular member defining a lumen; and  
4 a balloon having at least one electrode and defining an interior in fluid  
5 communication with the lumen of the tubular member, the balloon having a range of  
6 configurations including an expanded configuration corresponding to the tissue cavity  
7 and a collapsed configuration.

1 19. The apparatus of claim 18, wherein:  
2 the at least one electrode of the balloon is formed with the balloon.

1 20. The apparatus of claim 18, wherein:  
2 the at least one electrode of the balloon includes a plurality of conductive  
3 portions, two adjacent conductive portions from the plurality of conductive portions  
4 being separated by an insulation portion from a plurality of insulation portions.

1 21. The apparatus of claim 18, wherein:  
2 the at least one electrode is disposed within a first layer of balloon, the balloon  
3 further including a second layer and a third layer, the second layer of the balloon being

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4   formed of an insulation material, the third layer of the balloon being formed of its own  
5   at least one electrode.

1   22.   The apparatus of claim 21, further comprising:  
2           a radio-frequency generator coupled to the at least one electrode of the first layer  
3   of the balloon and the at least one electrode of the third layer of the balloon, the first  
4   layer of the balloon and the third layer of the balloon defining a bipolar configuration.

1   23.   A method for making an expandable ablation balloon formed of a conductive  
2   material and having a first portion and a second portion, comprising:  
3           masking the first portion of a balloon based on a mask;  
4           depositing an insulation layer on the second portion of the balloon;  
5           depositing a conductive layer on the second portion of the balloon; and  
6           removing the mask from the first portion of the balloon.

1   24.   The method of claim 23, the insulation layer being a first insulation layer, the  
2   method further comprising:  
3           depositing a second insulation layer on the second portion of balloon before the  
4   removing the mask from the first portion of the balloon.

1   25.   The method of claim 23, the insulation layer being a first insulation layer, the  
2   method further comprising:  
3           depositing a second insulation layer on the first portion of the balloon and the  
4   second portion of the balloon after the removing the mask from the first portion of the  
5   balloon.